

Briefing on Regional Energy Issues and the New England Governors' Energy Infrastructure Initiative

Wednesday, February 26, 2014
Senate Committee on Environment and Agriculture

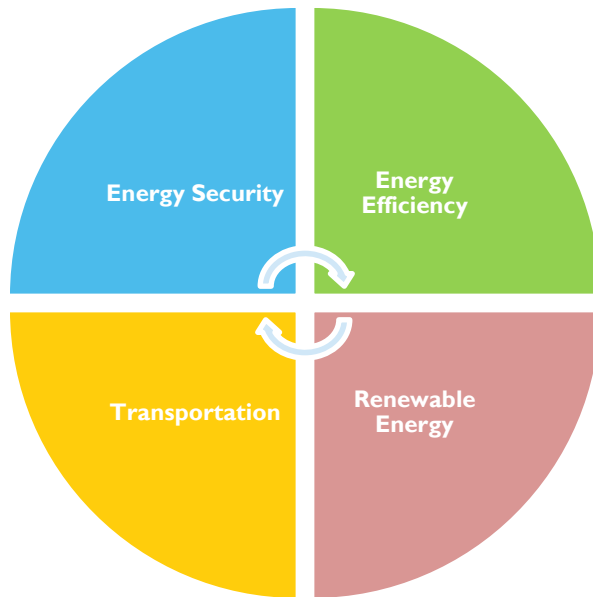


STATE OF RHODE ISLAND

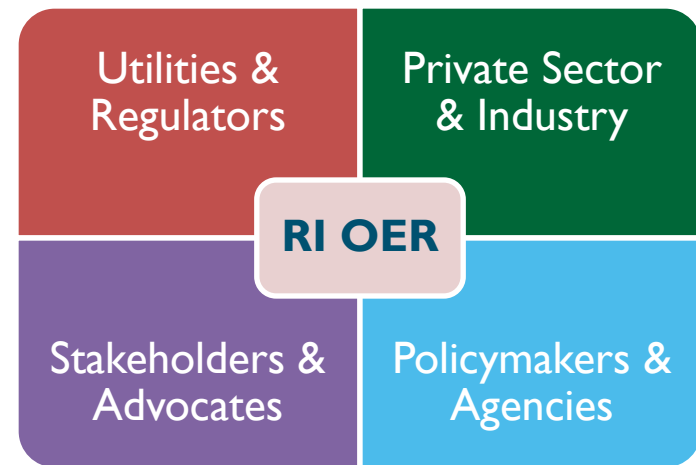
**OFFICE OF
ENERGY RESOURCES**

RI Office of Energy Resources (OER) Overview

**“Leading Rhode Island to a secure, cost-effective,
and sustainable energy future.”**



*The OER is the lead state agency on
energy policy and programmatic matters*



*The OER works closely with diverse
partners to advance Rhode Island as a
national leader in the new clean energy
economy*

Disclaimer

- Study data presented within this report includes directionally indicative costs and benefits associated with hypothetical power system conditions, market scenarios, and infrastructure solutions. As with any study, certain assumptions have been made with respect to underlying conditions, events, and circumstances consistent with generally accepted industry practices. Actual results may materially differ from those projected.
- Hypothetical infrastructure costs are illustrative and based upon assumed capital costs of upgrades and the annual carrying charges associated with them. They also assume the full transfer of risk to customers and away from merchant entities. These assumptions are not precise or predictive of actual costs that could emerge in a competitive process or as a result of negotiation. They do, however, provide a directional sense of costs associated with power system infrastructure improvements. The potential to risk share could reduce the potential indicative costs.

What your constituents are reading...



“The “overwhelming majority” of the increase, the utility said, is derived from a rise in the cost of wholesale production of electricity — costs that National Grid does not control...”

**“Utilities panel
approves 12.1
percent rate
hike for National
Grid electricity”**

-G. Wayne Miller,
Providence Journal
December 20, 2013

What your constituents are hearing...

**“RI electric bills
to rise by nearly
\$10 in January”**

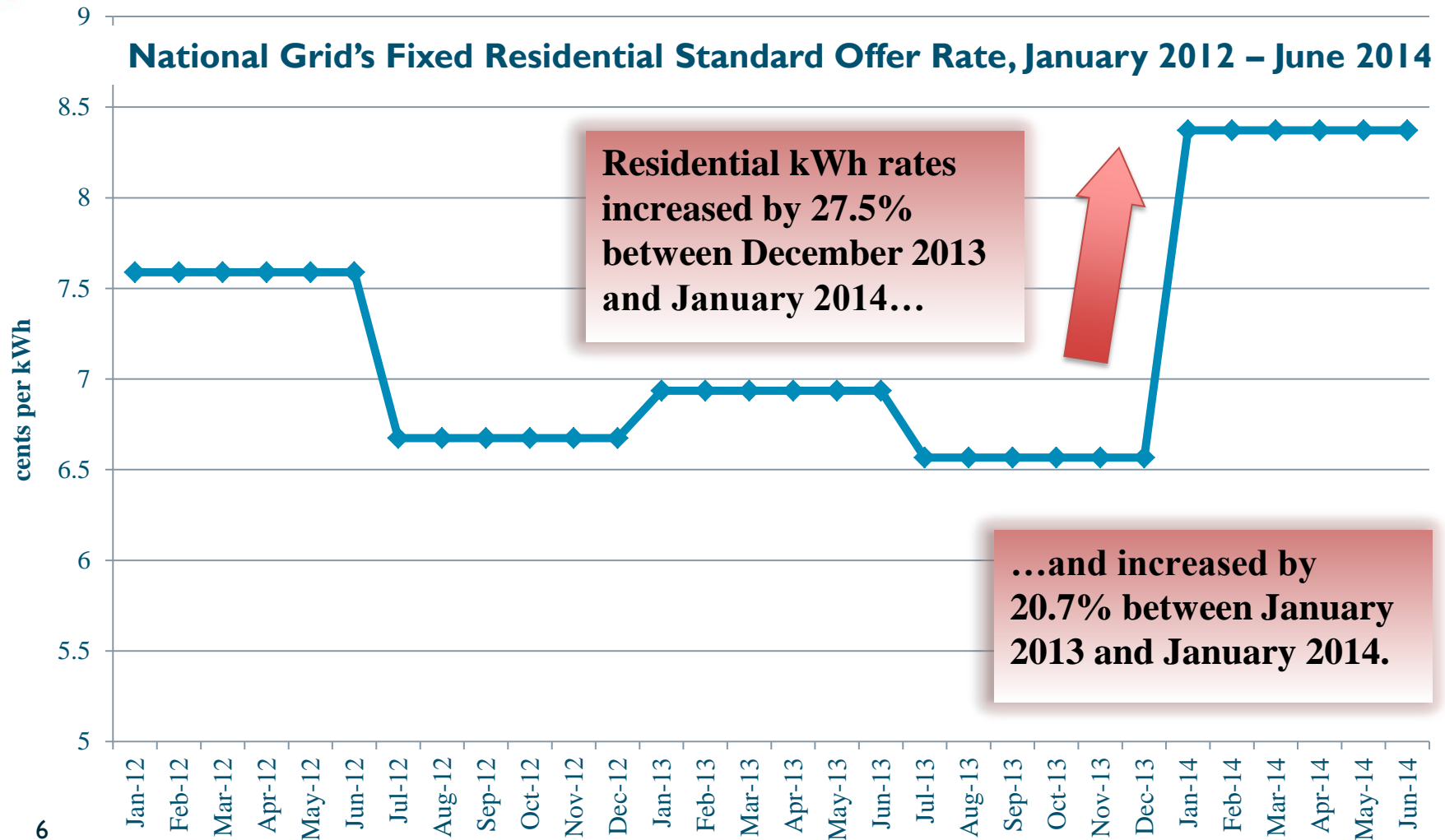
-Kim Kalunian
December 20, 2013



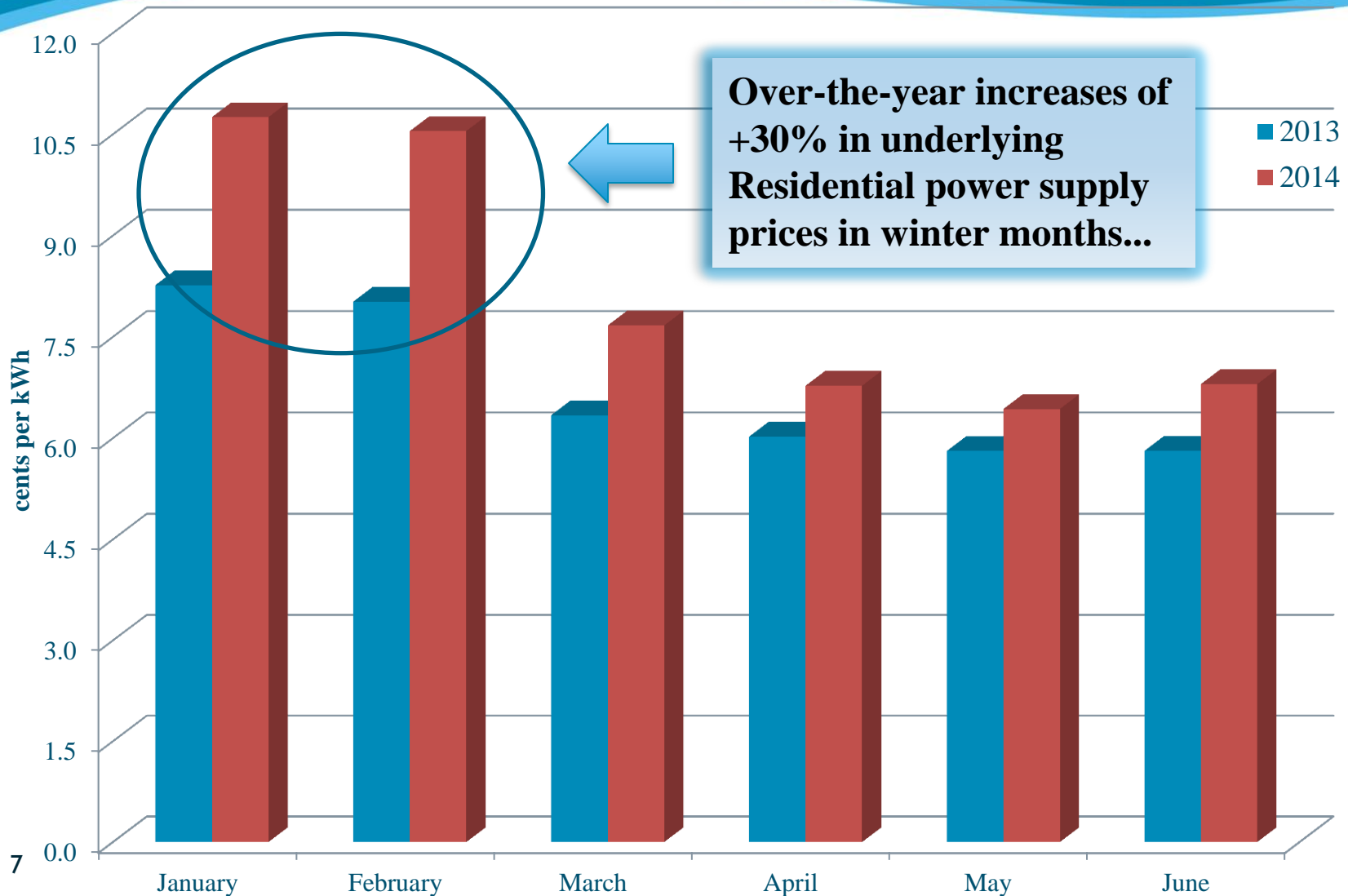
**“Unfortunately this increase is driven
by market forces we cannot control...”**

*Timothy Horan
President
National Grid - Rhode Island*

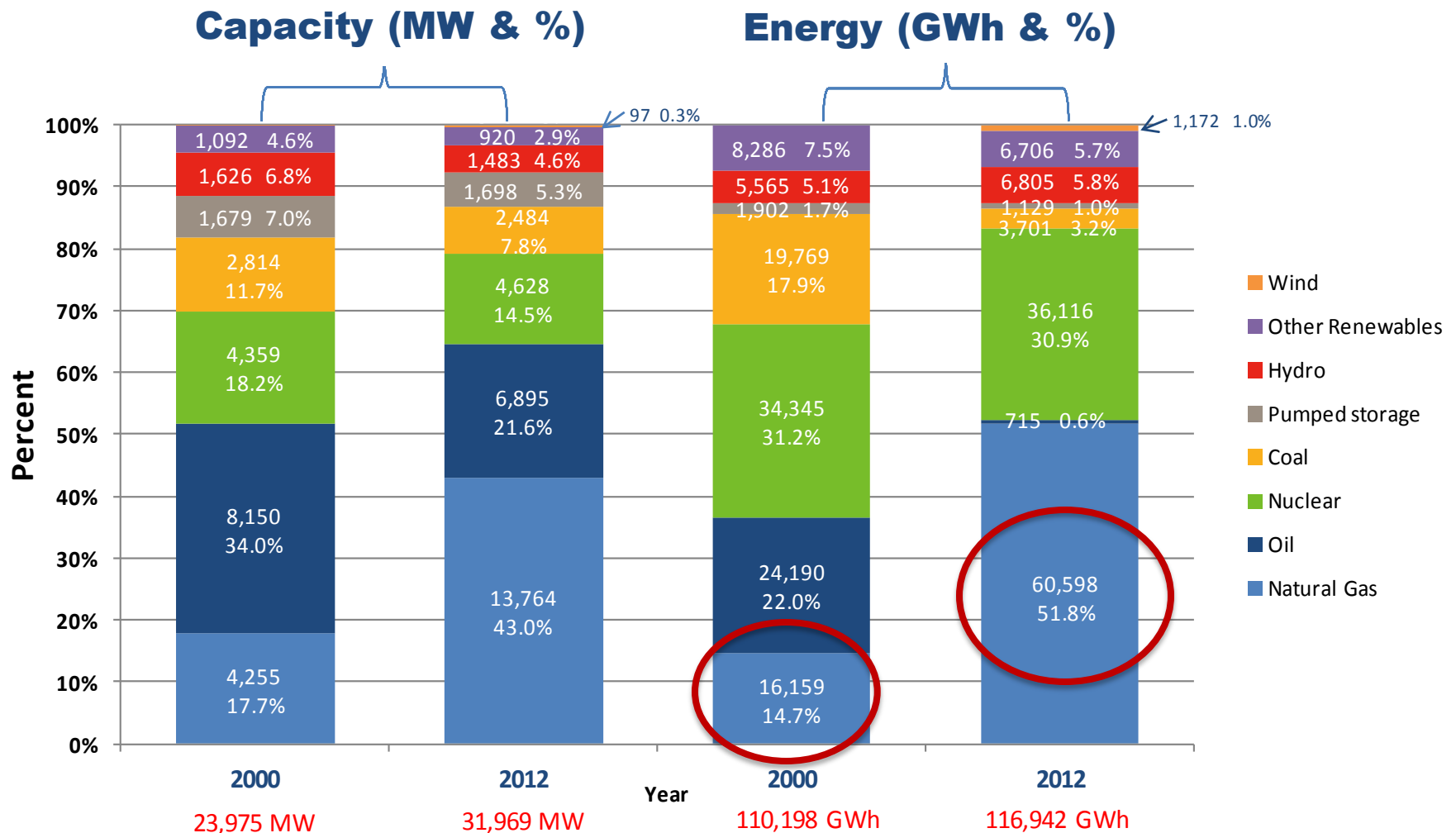
What your constituents are paying...



What your constituents are paying...



New England's Energy Supply Costs are driven by Natural Gas



Natural Gas – Energy Price Correlation

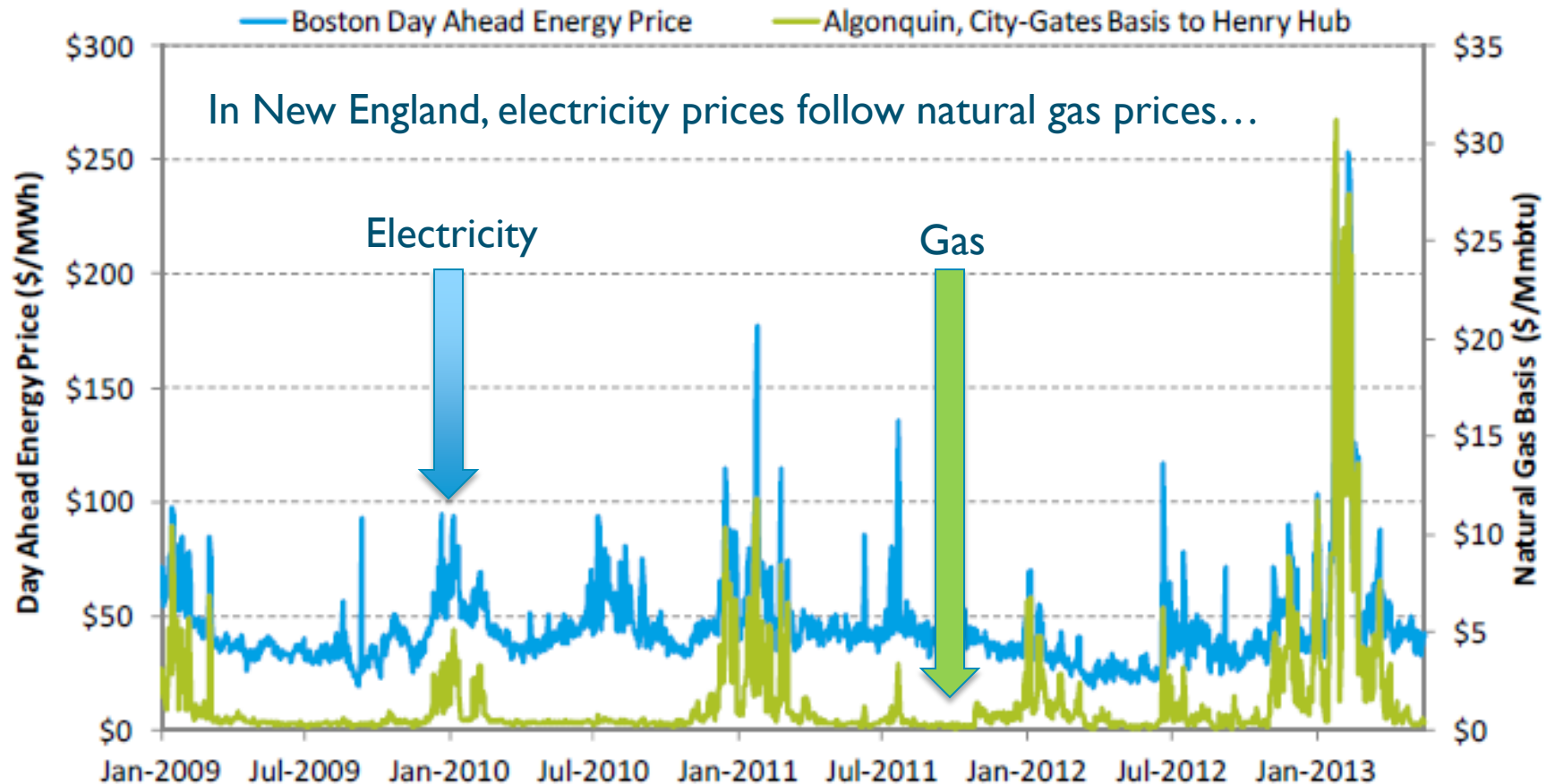


Figure 7 Historical New England Electric and Natural Gas Prices

Source: ISO-NE, Platts

Difference in Natural Gas Prices New England vs. National Benchmark

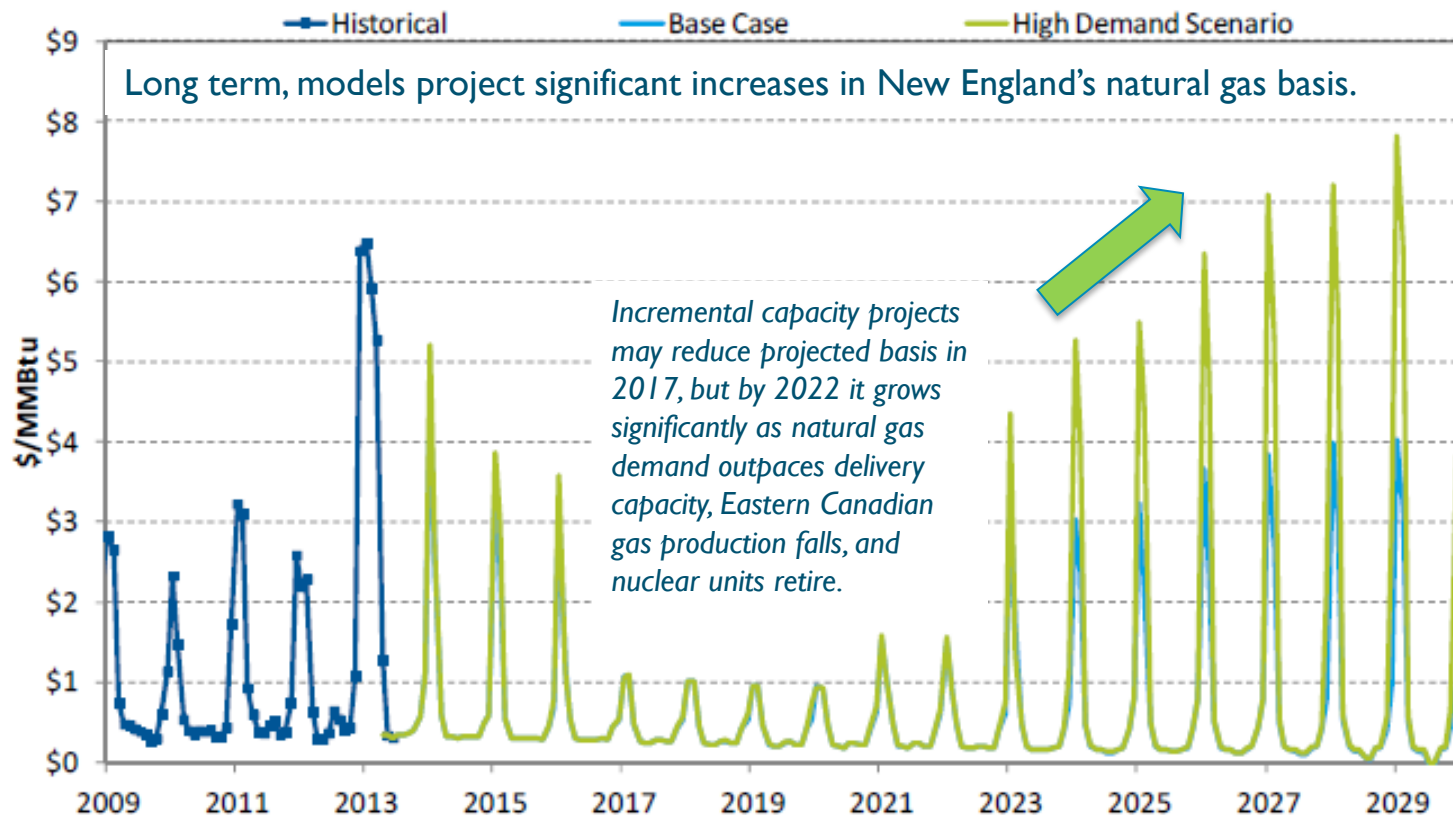


Figure 33 Monthly Algonquin City-Gates Basis to Henry Hub: Base Case vs. High Demand Scenario

Source: Platts historical data, Black & Veatch projection

Basis = the difference in price between New England's gas price and the benchmark price (Henry Hub/NYMEX).

Projected Energy Prices

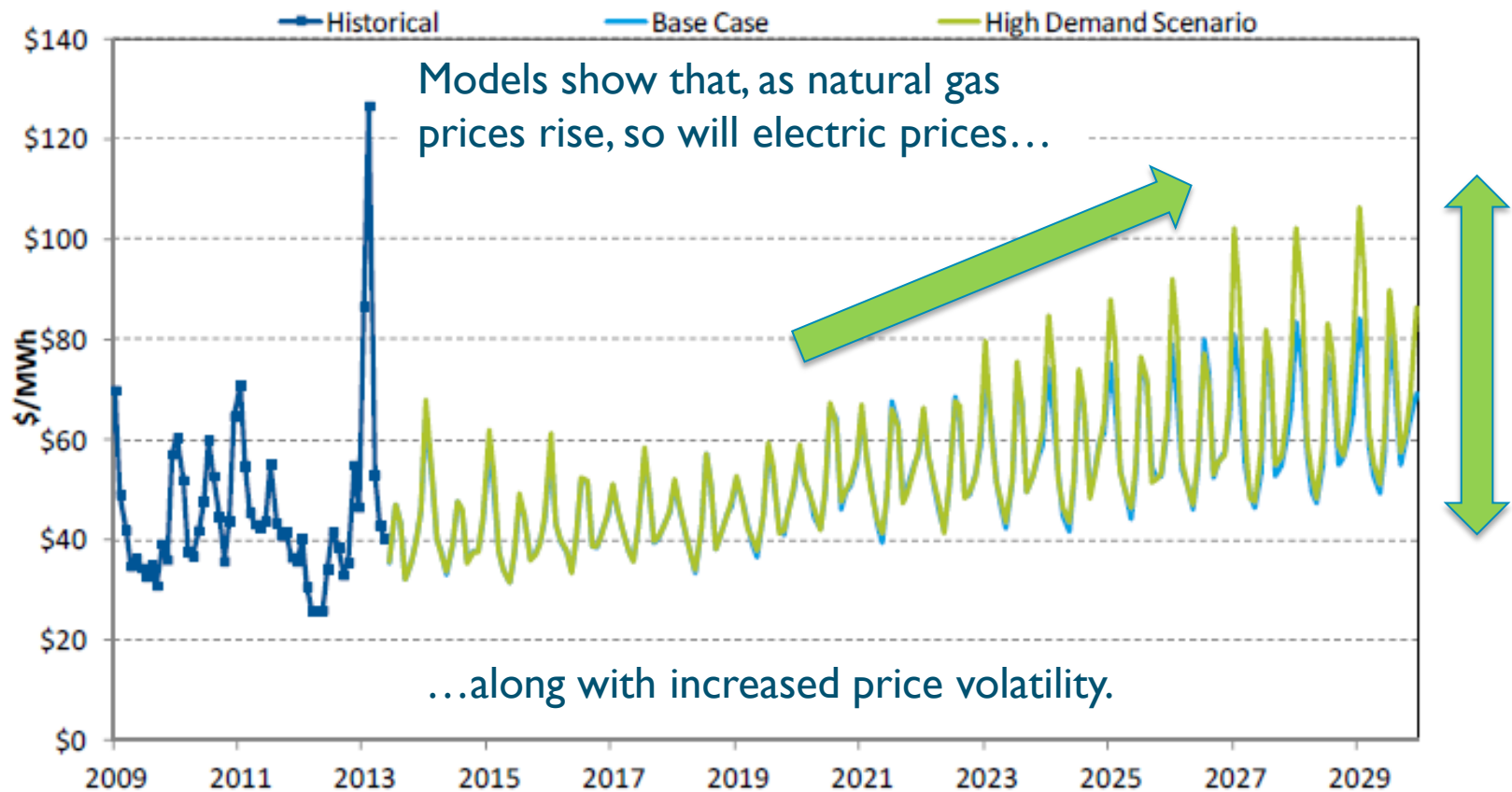


Figure 34 Boston Electric Prices: Base Case vs. High Demand Scenario

Source: *Energy Velocity* historical data, *Black & Veatch* projection

Not just a winter problem...

- *“During their peak winter days, the pipelines are fully utilized with not enough infrastructure to meet the needs of the gas-fired fleet.”*
- *“Even on non-peak days, [the pipelines] are often loaded to capacity to meet generator needs in New England. ”*
- *“The pipelines have confirmed that the pipes coming into New England from supply points to the west, including the Marcellus shale fields, are becoming constrained or operating near capacity in periods other than the winter.”*

- ISO-NE Whitepaper
July 30, 2012
(emphasis added)

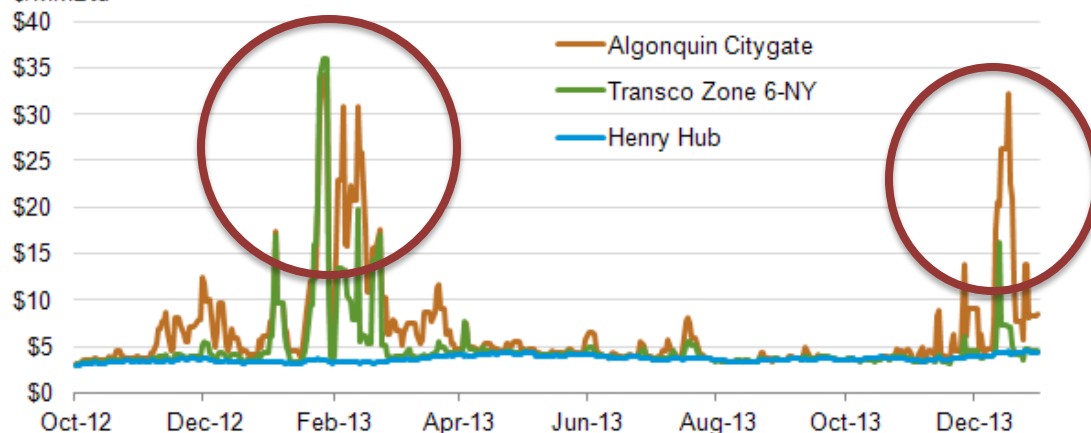
We can't afford NOT to act!

New England's Economic Disadvantage

Daily spot prices at Henry Hub and Northeastern points

October 1, 2012-December 31, 2013

\$/MMBtu



EIA: “Prices at the Algonquin Citygate hub serving New England...were affected by demand spikes driven by cold weather in January and December of this year.

These cold snaps pushed New England and New York spot prices well above the national average because of northeastern pipeline constraints that prevented supply from increasing to meet higher demand.”

“Pipeline expansions have alleviated the impact of constraints in the New York/New Jersey market, while constraints remain in New England.”

Futures prices further reflect the region's disadvantage...

Futures Prices in New England Soar

Source: Derived from ICE data.

*January and February 2014
*January and February 2013

*Power Note: Prices in \$/MWh; 2013 shows Peak Fin-swap prices and 2014 shows peak future prices. SP15 peak futures for Jan and Feb 2014 have not traded yet and the price is the average of the last bid and offer.

*Gas Note: Prices in \$/MMBtu. Regional futures natural gas prices are the sum of the Henry Hub futures contract price plus the regional basis futures.

**P
o
w
e
r**

**G
a
s**

Location	2014 [^]	2013 [*]
Massachussets Hub	\$100.00	\$65.65
PJM Western Hub	\$44.35	\$48.00
Northwest (Mid-C)	\$37.37	\$34.58
Southern California (SP-15)	\$43.12	\$42.63
New England (Algonquin)	\$11.75	\$6.59
Mid-Atlantic (Dominion South)	\$3.66	\$3.78
Southern California Border	\$3.95	\$3.88
Henry Hub	\$3.87	\$3.77

New England power futures for Jan/Feb 2014 were more than 2x higher than the Mid-Atlantic region...

...and natural gas price futures were more than 3x higher.

Don't just take our word for it...



“The highest natural gas prices in the country are in New England... due to ongoing pipeline congestion in the region.”

“On a high demand day, interruptions to pipeline customers with variable interruptible service are especially likely. The most vulnerable pipeline customers are power plants with interruptible contracts.”

*Federal Energy Regulatory Commission
October 17, 2013
Energy Market Assessment Report
[emphasis added]*

“... the region will face increasing risks to power system reliability and more volatile wholesale electricity prices, unless additional investments are made in fuel infrastructure and storage, or in alternative forms of electric energy production.”

*Gordon van Welie, CEO
January 28, 2014
Letter to NESCOE,
[emphasis added]*



STATE OF RHODE ISLAND
**OFFICE OF
ENERGY RESOURCES**

Don't just take our word for it...

Forbes

“The result is an escalating energy crisis in New England. Although the northeast has become the largest natural gas producing region in the United States, New England currently has the nation's highest natural gas prices.”

William Pentland,
December 5, 2013
[emphasis added]

nationalgrid

“We have a constraint on how much gas we can get into New England,” said Michael D. LaFlamme, National Grid's New England vice president for regulation and pricing. “We don't have [sufficient] gas transmission lines — the pipes — to get the gas from our sources.”

G. Wayne Miller,
Providence Journal
December 20, 2013
[emphasis added]



Why isn't sufficient natural gas capacity being built?

- Natural gas supplies are used for both heating and industrial needs, as well as electric generation.
- Gas pipeline and capacity expansion projects are undertaken when market actors enter into sufficient amounts of **firm capacity contracts** to **justify investment** by pipeline developers.
- **Firm contracts** guarantee delivery of supply across a pipeline, particularly during high-demand periods (uninterruptable).
- Gas LDCs procure their gas supply in this fashion to ensure delivery to their customers, but **generation assets do not.**

A Call for Action

- Without firm contracts, the electric generation sector has not driven and will not spur the necessary investments in gas pipeline infrastructure needed to:
 - Increase natural gas fuel supply into New England;
 - Reduce periods of natural gas supply constraint;
 - Mitigate energy price volatility; and
 - Stabilize energy prices for the region's consumers.
- Absent action, the problem will get worse – *electric rates will rise and economic competitiveness will suffer.*
- If the markets will not fix the problem, *who will?*

A Call for Action

- The New England Governors believe we must act to solve the region's energy crisis and spur investment in critically-needed energy infrastructure.
- We can do so in a coordinated manner that drives cost-effective investments, while protecting our environment and local economic opportunities.
- *Think Locally...* but also **Act Regionally!**

Think Locally...

- Rhode Island must continue to robustly invest in clean energy and energy-alternative resources...
 - Energy efficiency and Least-Cost Procurement
 - Distributed Renewable Generation
 - Renewable Energy Standard
 - Long-term Contracting Standard for Renewable Energy
 - Many of these investments generate local economic opportunities and create local jobs.

...but also act Regionally

- **...but the problem is much bigger than Rhode Island.**
 - Our energy system crosses borders and is highly integrated
 - New England is competing with other regions to attract new businesses and investment opportunities...
 - ...while its residents struggle to manage a growing energy cost burden, which reduces disposable income and stifles growth.
 - To remain economically competitive we must act regionally.
- **Governor Chafee and his regional counterparts have outlined a vision to position New England for long-term economic growth and environmental security.**

The New England Energy Infrastructure Initiative

- **Make strategic, coordinated investments in regional energy infrastructure that will:**
 - Strengthen state and regional economic competitiveness;
 - Meet common energy and environmental policy goals;
 - Diversify the region's energy supply portfolio;
 - Improve energy system reliability;
 - Increase the supply of cleaner, no-to-low carbon generation;
 - Mitigate energy price volatility;
 - Place downward pressure on long-term energy costs; and
 - *Achieve what no single state could do on its own.*

Initiative Scope

- **These goals can be achieved through two major energy infrastructure investment strategies:**
 - Expand pipeline capacity to increase natural gas supply into New England, reducing supply constraints and associated energy price volatility.
 - Expand electric transmission to facilitate utility-scale development and delivery of no-to-low carbon energy resources, such as hydroelectricity.

Expanding Natural Gas Capacity

- Drive investment in natural gas pipeline infrastructure by allowing for recovery of firm capacity costs through electric rates.
- Pipeline developers may build needed infrastructure knowing they have a pathway to long-term cost recovery.
- Costs would be shared appropriately among the New England States.
- Work with ISO-NE and stakeholders to develop tariff language and a structure that will ensure any new capacity will be made available in a manner that primarily benefits electricity customers.
- Any tariff and cost allocation mechanism will require FERC approval.

Potential Benefits of Regional Natural Gas Capacity Expansion

- Expansion of new gas pipeline capacity (1.2 bcf/d; 2017 in-service date) could generate **\$4.4 billion in net energy savings** through 2029.
- More conservative assumptions show that an expansion of natural gas capacity could still produce net energy benefits upwards of \$1.5 billion through 2029.
- **Roughly 95% of estimated benefits are associated with the reduced electricity prices that New England consumers would experience through the study period**, with some additional benefit to gas end-use customers.
- Secondary benefits associated with job creation, new economic opportunities, etc. were not modeled... but may have substantial value.

Expanding Electric Transmission to Facilitate Clean Energy

- The States will issue one or more coordinated RFPs to advance the development of transmission and delivery of at least 1200 MW of clean energy into New England.
- Infrastructure costs would be recovered through the ISO-NE tariff or through merchant projects in a manner that ensures costs are shared appropriately among the states.
- Depending on procurement structure, a subset of states (directly or through their utilities) may procure the power to ensure its delivery into the region, fostering price and environmental benefits.

Expanding Electric Transmission to Facilitate Clean Energy

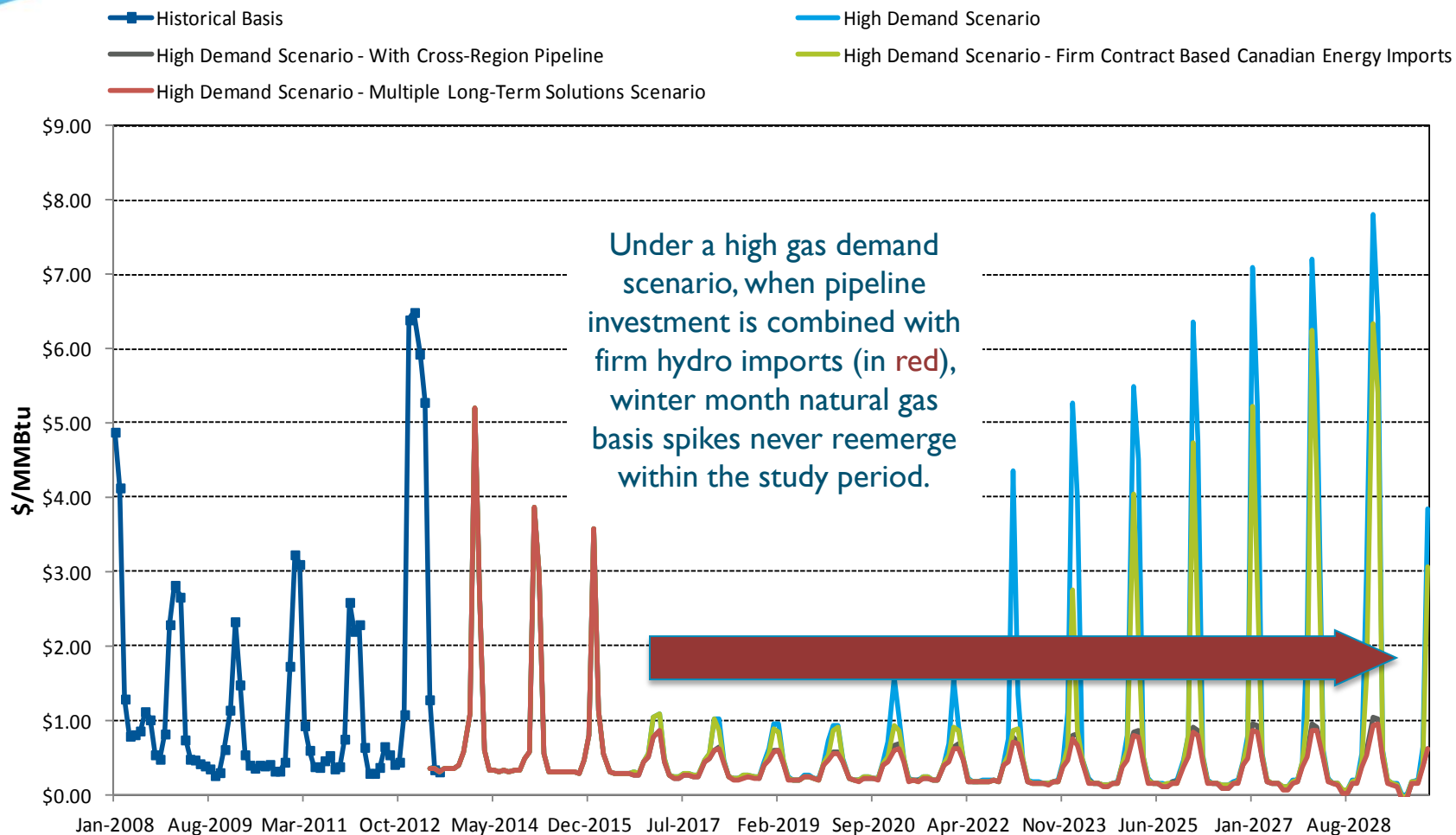
- Hydropower is a viable power source on our doorstep that could:
 - Displace less-efficient fossil fuel-based generation;
 - Improve fuel diversity and electric system reliability; and
 - Prove to be a less price-volatile, more cost-effective resource.
- Coordinated investments in electric transmission could facilitate the interconnection of “bottled-up” wind energy in northern New England, and other no-to-low carbon resources.
- Investment in expanded natural gas capacity could put downward pressure on prices negotiated for long-term, clean energy contracts.

It's interesting, but will it...

- Reduce long-term energy costs and price volatility?
- Decrease power sector greenhouse gas emissions?
- Still allow for local investment in other clean energy and efficiency resources?

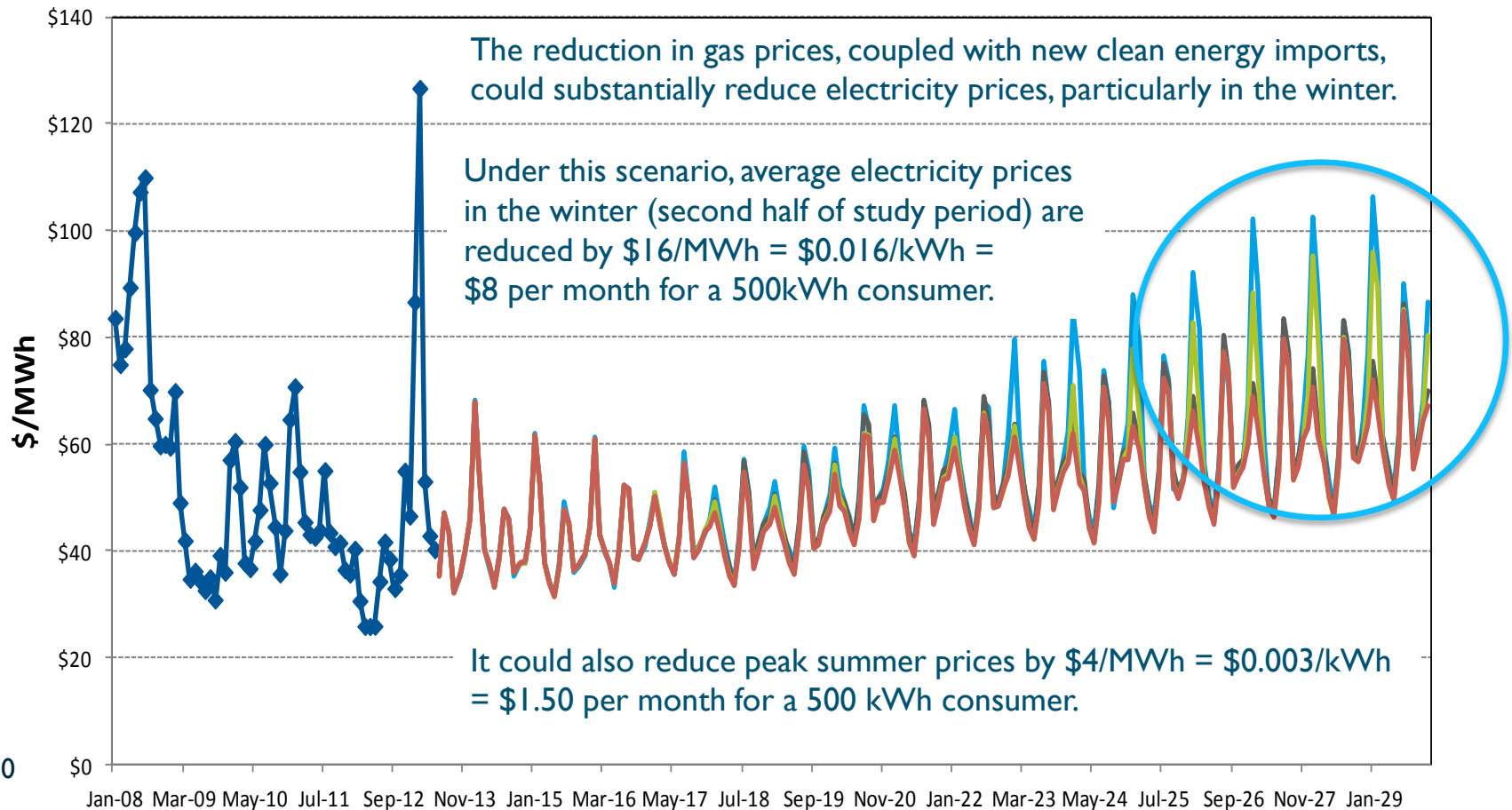
Let's take a look...

Impact of Multi-Solutions Scenario on Natural Gas Basis



Impact of Multi-Solutions Scenario on Electric Prices

- Historical
- High Demand - With Cross-Region Pipeline
- High Demand - Multiple Long-Term Solutions Scenario
- High Demand Scenario
- High Demand - With Firm Contract Based Candian Electric Imports



Billions in Potential Regional Benefits

- The states analyzed hypothetical investments in pipeline capacity expansion (1.2 bcf/d) and electric transmission facilitating the firm delivery of Canadian hydropower (1,200 MW).
- **Total Net Energy Benefits in excess of \$3 billion thru 2029.**
- **Average Net Energy Benefits of \$215 million per year.**
- Investment in pipeline or transmission alone were shown to be **cost effective** and could each deliver net benefits to consumer.
- Does not account for price negotiations; risk sharing arrangements; price benefits beyond the study period 2029; and general impacts on the economy stemming from energy price reductions.

Estimated
Cost/Benefit
Ratios

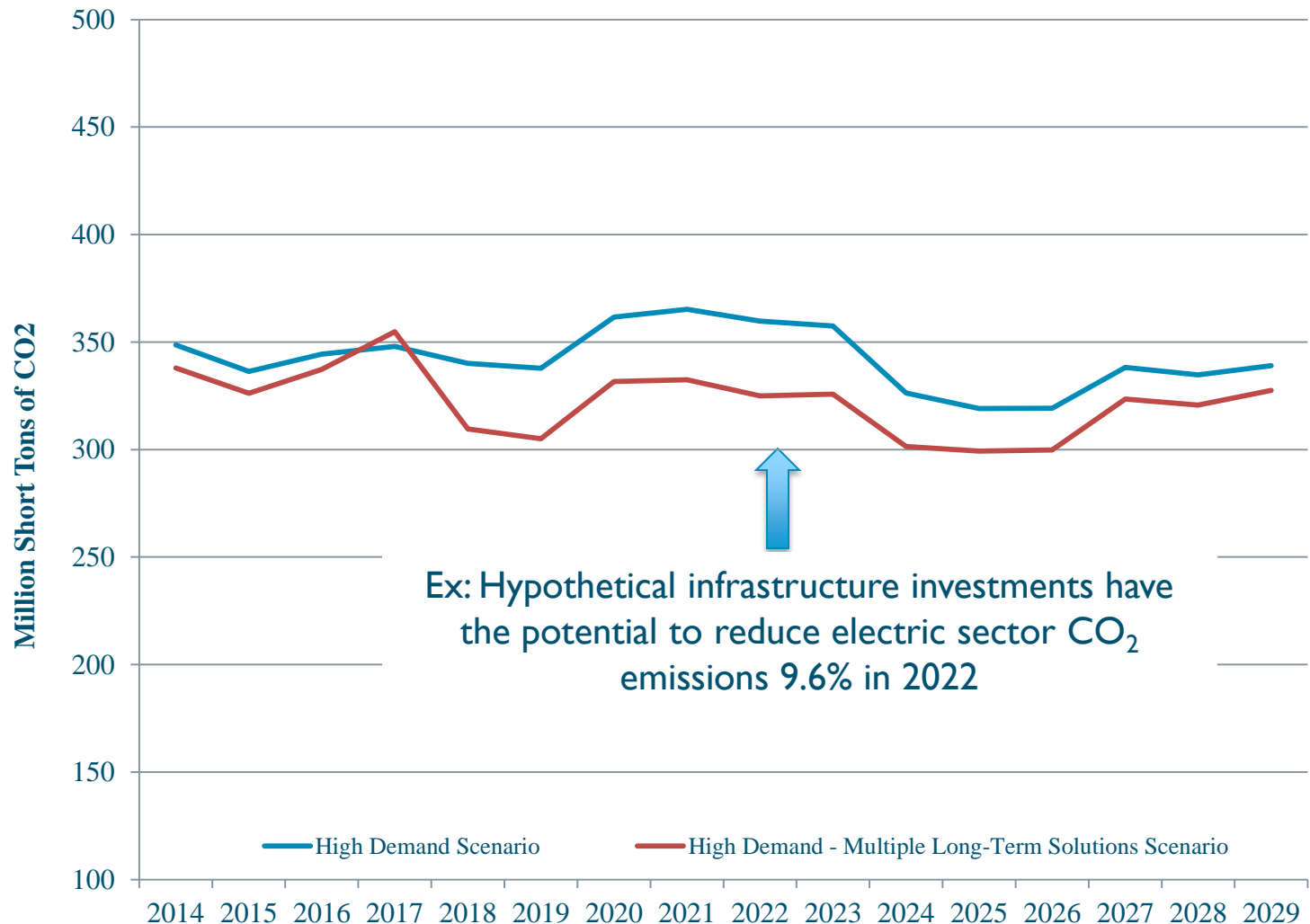
Gas Pipeline
2.93:1

Firm Hydro
1.32:1

Combined
1.46:1

Projected CO₂ Emission Reductions from Power Sector

Although not monetized in the net benefits data, increased hydro imports can substantially reduce CO₂ emissions from the power sector as a whole...even with expanded natural gas capacity.



Sustained Local Investment is Critical

- **OER's State Energy Plan analysis supports the need for both *local* and *regional* investment.**
 - For example, modeling shows that to meet a 45% reduction in greenhouse gas emissions by 2035 and maximize energy portfolio diversity, Rhode Island may have to:
 - Achieve robust energy efficiency gains of 20%; and
 - Develop over 350 MWs of local renewable generation; and
 - Expand the state's Renewable Energy Standard (RES) to 40%; and
 - Successfully develop the Deepwater Wind Projects, including utility-scale; and
 - Facilitate 1,200 MW of new imported Canadian hydropower; and
 - Foster significant local investments in the transportation and thermal sectors.
- **“All of the above” clean energy strategy**

It's interesting, but will it...

- Reduce long-term energy costs and price volatility? Yes!
- Decrease power sector greenhouse gas emissions? Yes!
- Still allow for local investment opportunities in other clean energy and efficiency resources? Yes!

We can achieve these goals in a cost-effective manner that:

- Improves economic competitiveness;
- Reduces long-term energy costs;
- Enhances system reliability and portfolio diversity;
- Fosters in-state investments & job growth in the clean energy sector; and
- Honors Rhode Island's vision for a clean, environmentally-secure future.

Process

- **September 2013: Governor Chafee met with New England Governors and Eastern Canadian Premiers**
 - Discussions explored themes of common interest regarding clean energy, including hydropower.
 - Resolution 37-1, signed by Governor Chafee on behalf of the Governors, considered expansion of cross-border clean energy supply and trade; maximizing overall environmental benefits; and affirmed support for coordinated procurement.
- **Since then, New England's energy officials have met regularly to discuss common areas of interest and pathways toward Energy Initiative implementation.**

Process

- **December 2013 – New England Governors issue statement on “Commitment to Regional Cooperation on Energy Infrastructure Issues”**
- **January 2014 – States’ Request Technical Support and Assistance from ISO-NE**
- **January 2014 – ISO-NE issues response acknowledging the need for action**

Questions?

State and Federal Offshore Wind Project Updates

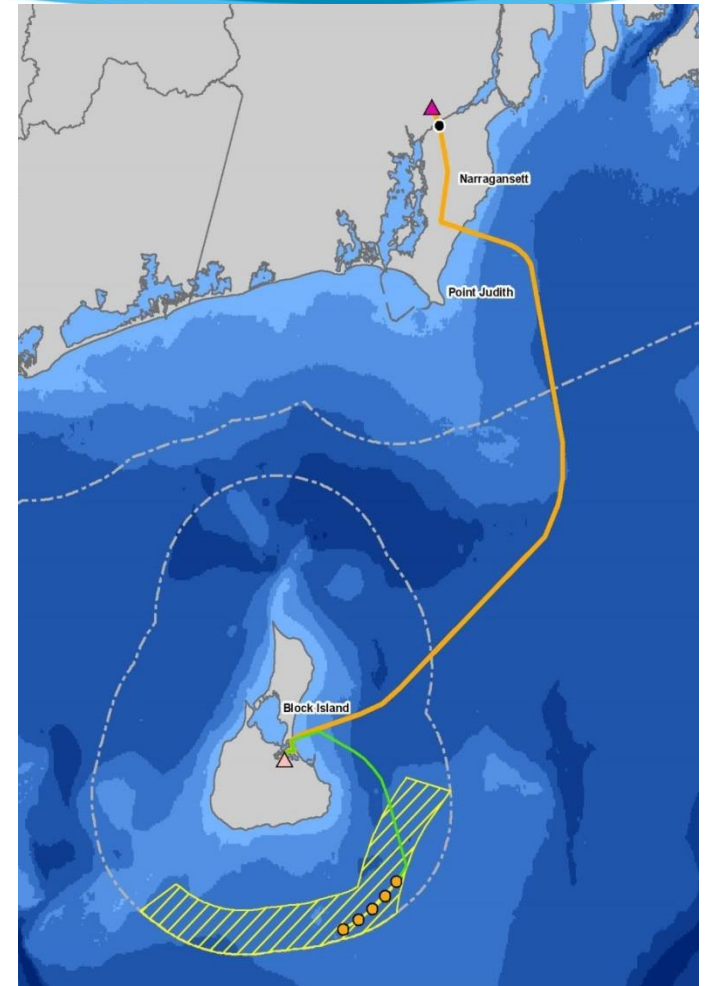


STATE OF RHODE ISLAND

**OFFICE OF
ENERGY RESOURCES**

Block Island Wind Farm: On Track to be First in the US

- Size: 30 megawatts – enough power for 17,000 homes
- Turbines: Latest 6 megawatt offshore turbine from global technology and industrial company Alstom
- Cable: 18 miles from Block Island to Scarborough State Beach
- Permits: Expected early 2014
- Construction: 2015-16 – 200 construction period jobs locally
- The OER, CRMC, DEM and Governor's Office have been actively involved in the projects development over the past two years.



STATE OF RHODE ISLAND
**OFFICE OF
ENERGY RESOURCES**

Alstom Wind Turbine



Deepwater Wind has purchased the wind turbine that will be installed at the Block Island project. The Alstom 6 megawatt wind turbine will be installed.

Five of these wind turbines will be installed.

Deepwater Wind Energy Center

A Regional Energy Center to Serve the Entire Northeast, Based Here in RI



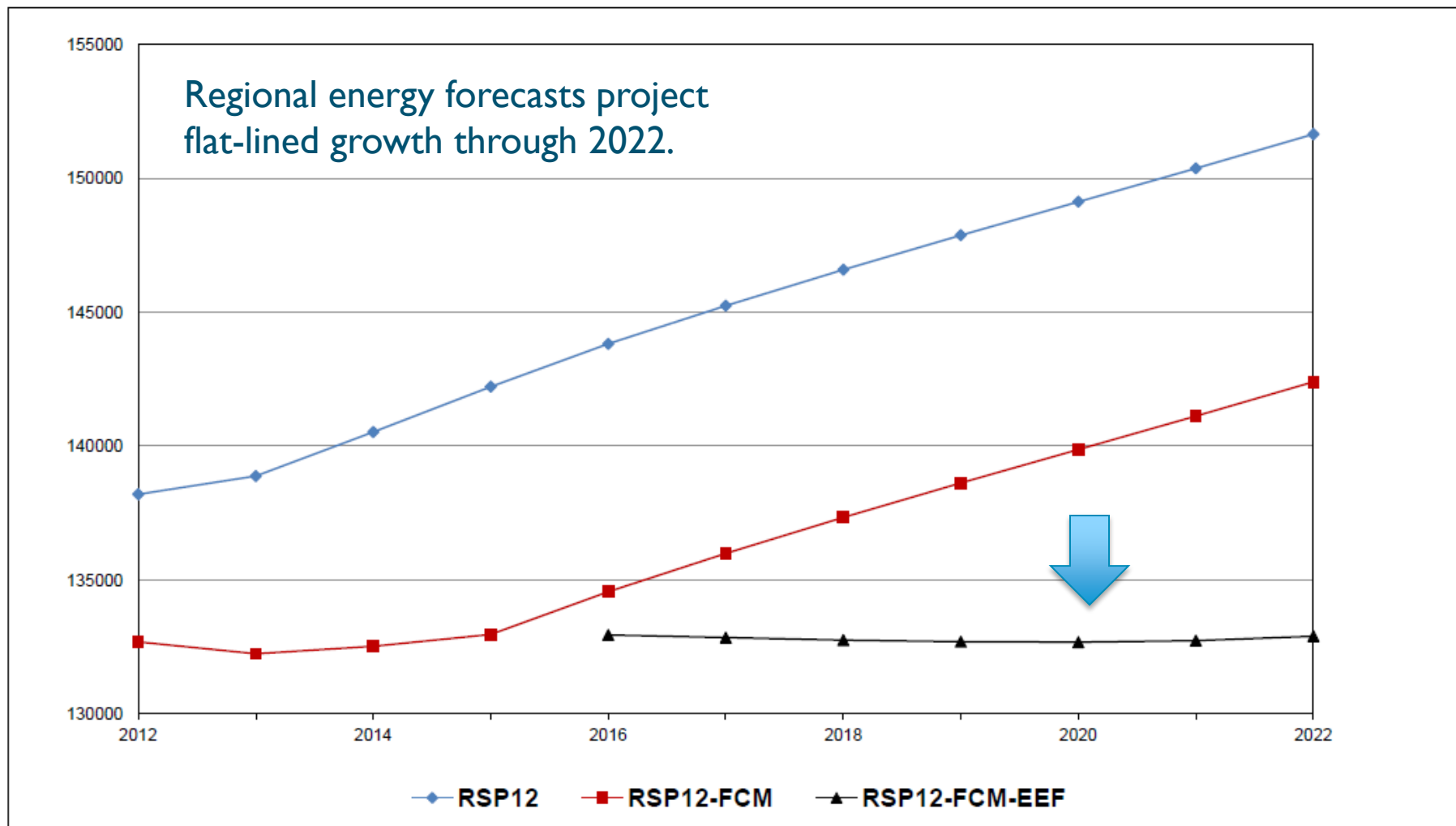
Deepwater Wind was selected by the federal government during the first U.S. federal offshore wind auction in July 2013.

CRMC Review Process

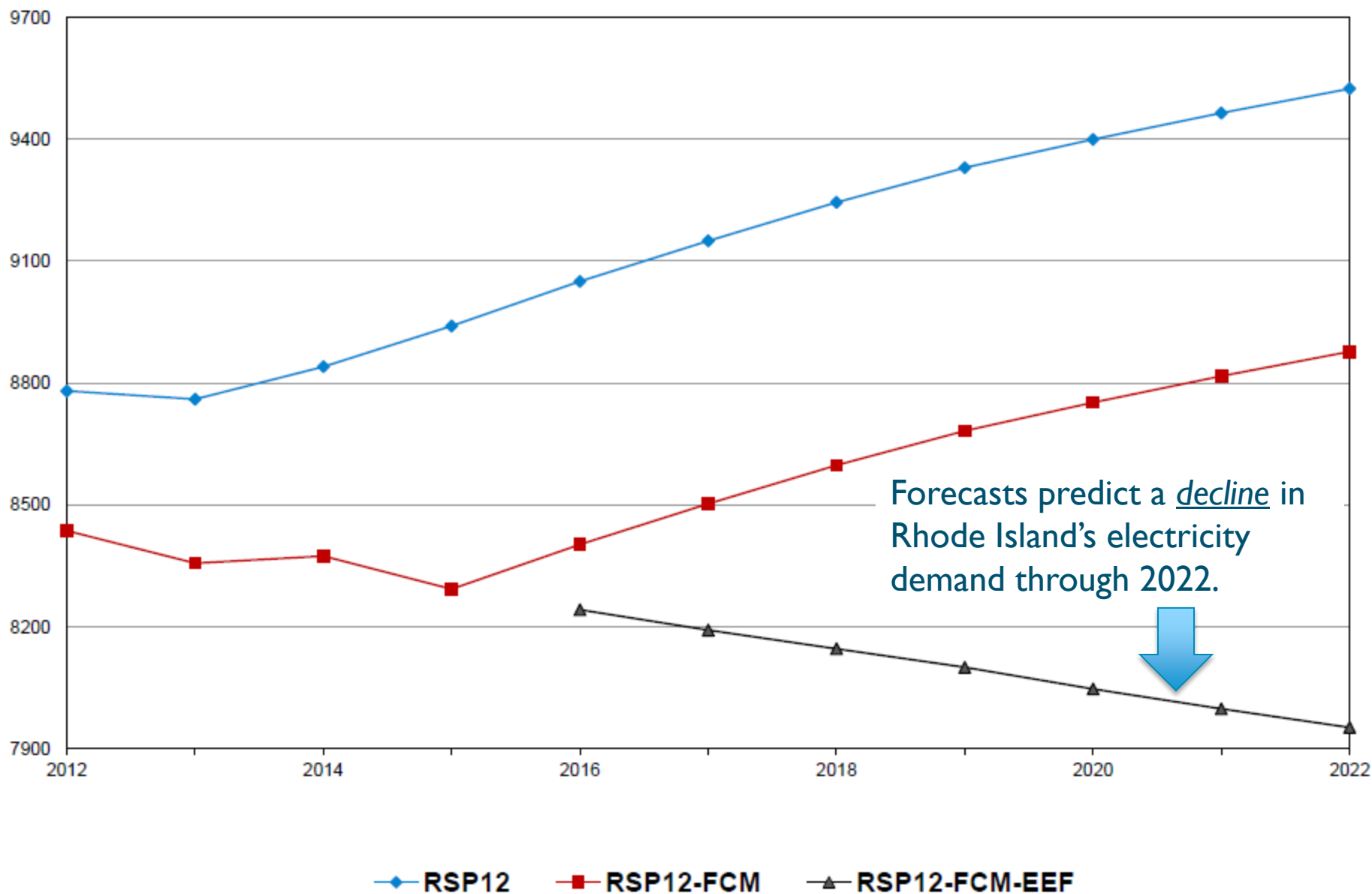
- The CRMC has started final public hearings on the project.
- CRMC hosted one hearing in early February and two more are scheduled on February 24 on Block Island and February 27th at the URI Bay campus.
- Once the CRMC sub committee finishes hearings they will hold a workshop then formulate a recommendation to go to the council.
- Assuming the CRMC approves it then we move to the CVA phase which is an engineering review.
- Once that is completed, then the CRMC will issue final go ahead and a lease for the project.

Additional Reference

ISONE Annual Energy Forecast



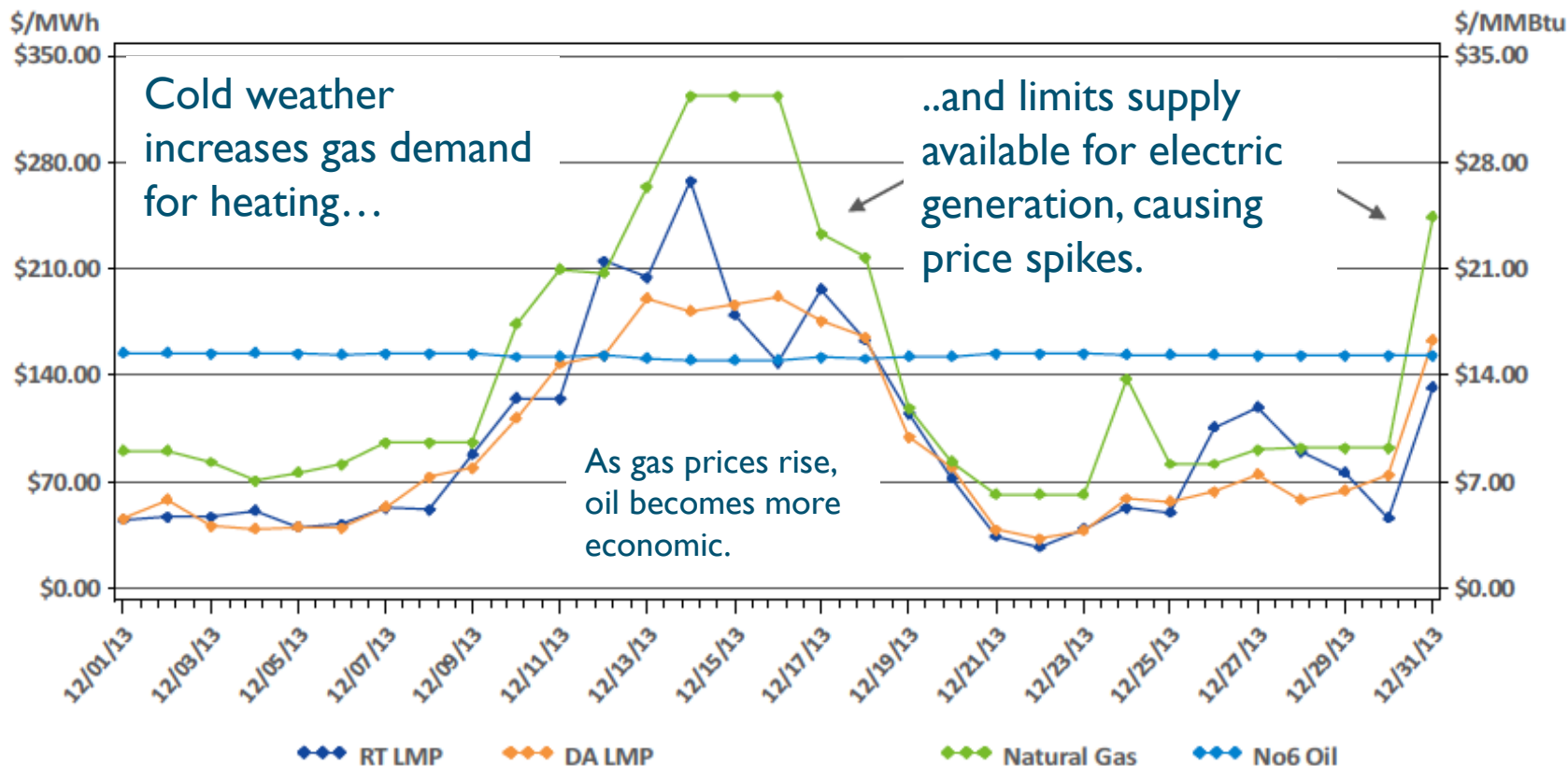
RI Annual Energy: RSP12 Forecast (GWh)



High Gas Case Assumption

- Cross-Region Natural Gas Pipeline - A 1.2 Bcf/d natural gas pipeline is constructed to provide New England with additional natural gas supplies and reinforce existing natural gas infrastructure.
- Firm-Based Energy Imports – An electric transmission line importing 1,200 megawatts (MW) of energy from Canada that delivers *firm* energy supplies, a constant amount of energy equal to the maximum capacity of the transmission line enabled through the construction of additional generation infrastructure.
- All New England states implement incentives to encourage increased residential and commercial usage of natural gas similar to Connecticut's Comprehensive Energy Strategy. However, Black & Veatch lowered assumptions for growth in customer penetration in states that already have high rates of penetration.
- New England states are expected to meet 75% of their RPS targets, rather than the 100% assumed in the Base Case. This assumption increases electric-sector demand for natural gas.
- Lower energy efficiency achievement increases net load growth. The growth rate in energy efficiency was lowered to achieve a 0.20% per year growth rate in electric energy demand over the study period, versus the 0.18% in the more energy-efficient Base Case.
- Expedited nuclear power plant deactivations increase natural gas demand, due to assumed energy replacement from gas-fired power generators. In the Base Case, three nuclear units (Pilgrim, VT Yankee, and Millstone II) are assumed to be deactivated concurrent with licenses expiring in the 2032-2035 time period. In the High Demand Scenario, the licenses are assumed to expire five years sooner.
- An additional 4 Bcf/d of LNG (relative to the Base Case) is assumed to be exported from the Gulf Coast and West Coast between 2017 and 2020, reducing the availability of gas supplies from the Gulf Coast and Appalachian shales to meet New England demand.

DA and RT ISO-NE Hub Prices and Input Fuel Prices: December 1-31, 2013



derlying natural gas data furnished by:



Average price difference over this period (DA-RT): \$-5.57

Average price difference over this period ABS(DA-RT): \$18.38

Average percentage difference over this period ABS(DA-RT)/RT Average LMP: 19%

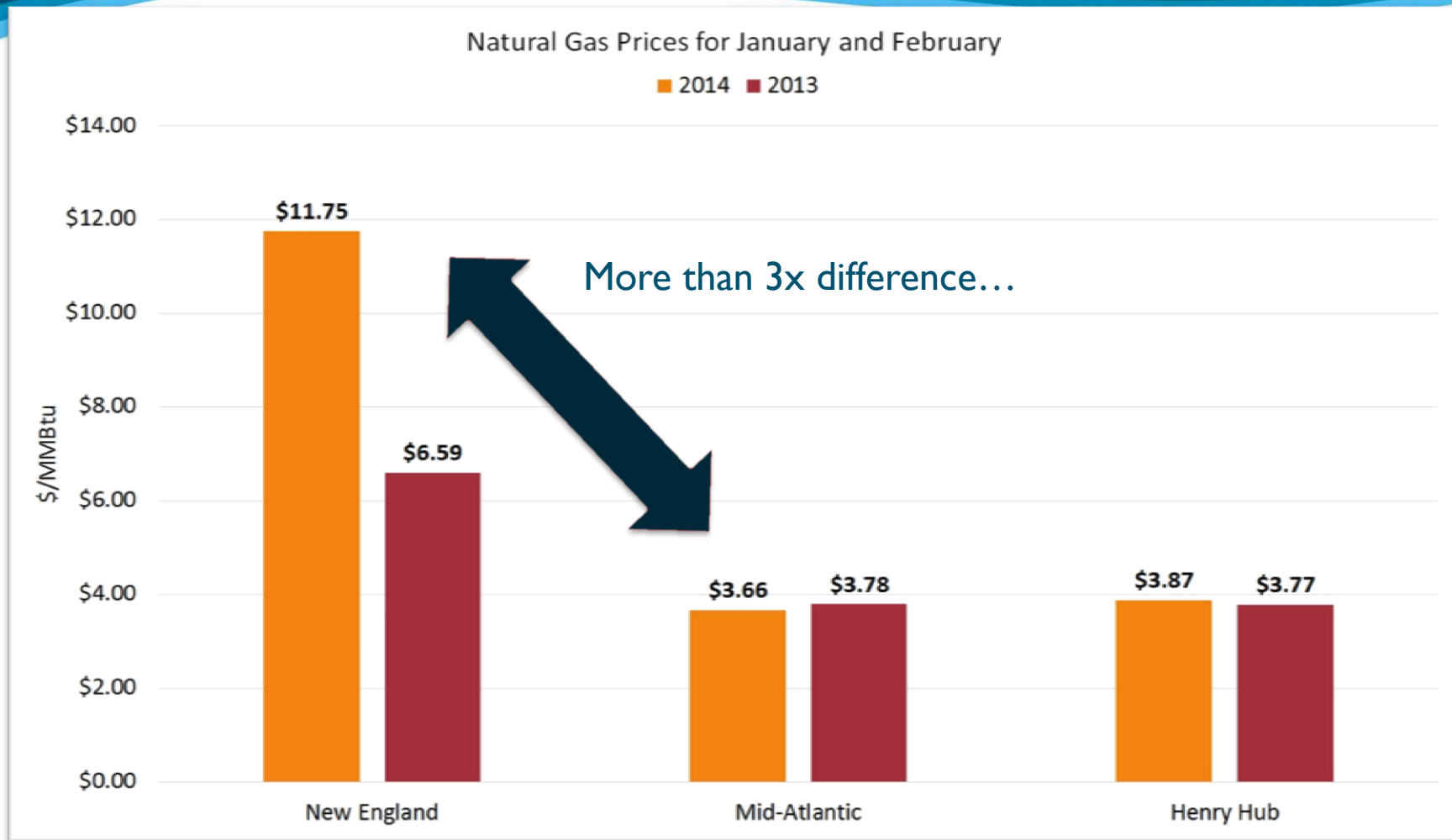
Gas price is average of Massachusetts delivery points; No6 Oil is New York Spot Price from DOE's Energy Information Administration

RI Wholesale Energy Costs

January 2014

Wholesale Component, All Hours	January 2014 (750,860 MWh)	January 2013 (722,159 MWh)	Over-the-year Change	
			\$	%
<u>Total Wholesale Rate</u> ¢/kWh per 500 kWh	18.728¢ \$93.64	9.563¢ \$47.82	+9.165¢ +\$45.83	+95.8% +95.8%
<u>Energy Only</u> ¢/kWh per 500 kWh	16.345¢ \$81.73	8.422¢ \$42.11	+7.923¢ +\$39.62	+94.1% +94.1%
Total Wholesale Costs	\$140.6 Million	\$69.1 Million	+\$71.6 million	MORE THAN DOUBLE

New England's Economic Disadvantage



Sustained Local Investment is Critical

- **Governor Chafee and the N.E. Governors recognize the benefits stemming from robust local investment:**
 - The states “believe that investments in local renewable generation, combined heat and power, and renewable and competitively-priced heating or buildings will support local markets and result in additional cost savings, new jobs and economic opportunities and environmental gains.”

– N.E. Governors’ Statement, December 2013
- **Existing state policies mandate critical local investments in energy efficiency and renewable distributed generation.**
 - These investments **MUST** continue if Rhode Island is to further reduce long-term energy costs, mitigate energy price volatility, enhance energy security, and meet our environmental goals.